Healthy Eating and Exercising: Promoting Effective Diabetes Self-Management

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1. Background

- An estimated 20.8 million people in the United States have diabetes mellitus (DM) (National Diabetes Fact Sheet, 2005).

- The American Diabetes Association (ADA, 2006) recommends focusing on controlling body weight, getting more physical activity, and choosing more vegetables, fruits and whole grains to control and medically manage diabetic complications.

- As with the general population, people with diabetes are encouraged to eat a variety of fiber-containing foods. Monitoring carbohydrates, whether by counting, exchanges, or experienced-based estimation is a key strategy in achieving glycemic control. Restricting intake of saturated and trans fatty acids is recommended to reduce the risk of cardiovascular complications of diabetes.

- The ADA (2006) recommends at least 150 min per week of moderate-intensity aerobic physical activity and/or at least 90 minutes per week of vigorous aerobic exercise. The physical activity should be distributed over at least 3 days per week and with no more than 2 consecutive days without physical activity.

- Physical activity interventions in diabetes treatment are often part of more comprehensive lifestyle interventions that include diet and may focus on weight loss (Samuel-Hodge, Hill-Briggs, & Gary, 2006).

The Robert Wood Johnson Foundation Diabetes Initiative

- The Robert Wood Johnson Foundation funded 14 clinical and community based programs to participate in its Diabetes Initiative which explores comprehensive models for diabetes self-management (Fisher et al., 2007, in press). The programs take different approaches to promoting self-management through the provision of resources and supports for self management.

- The projects funded by the Initiative have used various strategies to incorporate physical activity and healthy eating into their self-management programs.

- Popular strategies for healthy eating include evaluating the distribution of food choices using a rating your "plate" approach. The plate should be half vegetables or fruit, one fourth of meat or other protein rich food and one quarter starch (http://www.diabetes.org, accessed 2006).

- Many of the programs encourage walking as the physical activity of choice. Walking clubs and planned activities during support group meetings or diabetes education classes are prominent at some sites. At others, participants are encouraged to walk on their own.
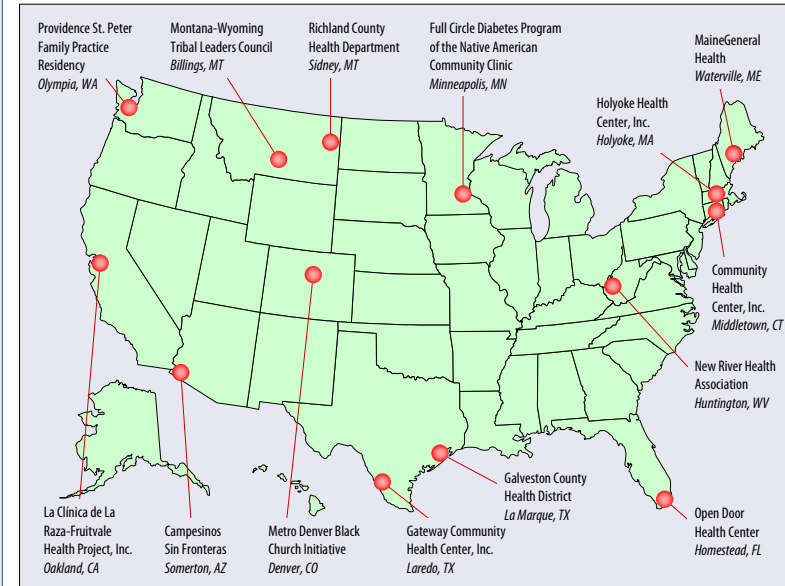
2. Research Objectives

- To evaluate the eating and physical activity habits of diabetics participating in a self-management initiative
- To examine the factors that are associated with better eating and the effect of program participation on self-reported eating
- To examine the factors that predict the probability of meeting exercise guidelines and the effect of program participation on meeting the guidelines
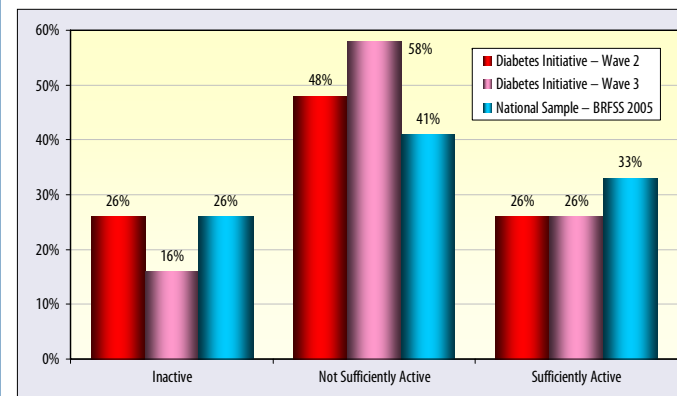
3. Study Design

- RTI International conducted a general and cross-site evaluation of the Diabetes Initiative.

- The overarching goal of the cross-site evaluation is to document the best practices of self-management programs, identify similarities in the different program approaches and the relationships to patients, and assess the behavioral, clinical, and quality-of-life outcomes. The evaluation is assessing program reach, implementation, and effectiveness using a multi-modal approach. This included:
  - (1) in-person site visits to the grantee programs
  - (2) enrollment data
  - (3) clinical data collected at the individual level (e.g., HbA1c, blood pressure, cholesterol)
  - (4) three waves of a longitudinal cross-site participant survey.

- As part of the overall evaluation survey, we surveyed a cohort of 652 participants across nearly all sites at three waves of the survey (roughly one year apart) about their level of physical activity and eating behaviors. In this analysis, we present data from Waves 2 and 3. Wave 1 physical activity data are not included because they were assessed using a different measure and therefore are not comparable. Data presented on physical activity only includes participants who reported engaging in 360 minutes or less of physical activity per week. Participants with greater than this amount of physical activity were treated as a distinct group (e.g., day laborers).

Programs Participating in the Diabetes Initiative

Providence St. Peter Family Practice Residency
Olympia, WA

Montana-Wyoming Tribal Leaders Council
Billings, MT

Richland County Health Department
Sidney, MT

Full Circle Diabetes Program of the Native American Community Clinic
Minneapolis, MN

MaineGeneral Health
Waterville, ME

Holyoke Health Center, Inc.
Holyoke, MA

Community Health Center, Inc.
Middletown, CT

New River Health Association
Huntington, WV

La Clinica de La Raza-Fruitvale Health Project, Inc.
Oakland, CA

Campesinos Sin Fronteras
Somerton, AZ

Metro Denver Black Church Initiative
Denver, CO

Gateway Community Health Center, Inc.
Laredo, TX

Galveston County Health District
La Marque, TX

Open Door Health Center
Homestead, FL

4. Results

Figure 1. Overall Level of Physical Activity of Participants in the Diabetes Initiative as Compared to a National Sample of Diabetics Using BRFSS (2005) Data

Note: Both samples were assessed using the BFRSS.

Table 1. Socio-demographics Characteristics of the Sample (N = 652)

Variable	N (%)
Age…mean (SD)	56.9 (11.7)
Gender	
Male	184 (28%)
Female	468 (72%)
Ethnicity	
Hispanic	326 (50%)
Nonhispanic	326 (50%)
Race	
American Indian	78 (12%)
African American	63 (10%)
Caucasian	332 (51%)
Other	176 (27%)
Insurance Status (Wave 2)	
Insured	468 (72%)
Not Insured	184 (28%)

Variable	N (%)
Marital Status	
Married	293 (45%)
Not Married	358 (55%)
BMI (wave 2)	
Underweight	4 (1%)
Normal	67 (11%)
Overweight	147 (23%)
Obese	407 (65%)
Length of time with diabetes …mean (SD)	9.2 (8.7)
Days enrolled in program …mean (SD) Wave 2	468 (274)

Table 2. Frequency (and Percentage) of Participants with Specific Self-Reported Eating Habits at Waves 2 and 3

Item	Wave 2 (N=640)	Wave 3 (N=640)
In the past 3 months, how often did you eat more than you should?		
Never/rarely	221 (34%)	230 (36%)
Sometimes	304 (48%)	322 (50%)
Usually/always	115 (28%)	88 (14%)
In the past 3 months, how often did you have sugary drinks such as juice, Coke, or sweet tea?*		
Never/rarely	354 (55%)	369 (58%)
Sometimes	205 (32%)	215 (34%)
Usually/always	81 (13%)	56 (9%)
Where are your meals prepared?		
Mostly at home	519 (81%)	517 (81%)
A lot at home, but also regularly eat out or take out	98 (15%)	88 (14%)
Mostly eat out or take out	21 (3%)	30 (5%)
On how many of the past 7 days did you have at least 5 servings of fruit and vegetables a day?		
0-2	217 (34%)	216 (34%)
3-4	207 (32%)	222 (35%)
5-7	216 (34%)	202 (32%)
On how many of the past 7 days did you eat high fat foods at your main meal of the day?**		
0-2	412 (64%)	455 (71%)
3-4	160 (25%)	155 (24%)
5-7	68 (11%)	30 (5%)
On how many of the past 7 days did you space carbohydrates evenly throughout the day?		
0-2	247 (40%)	244 (39%)
3-4	184 (30%)	187 (30%)
5-7	190 (31%)	190 (31%)

Note: Analyses include only participants present at Waves 2 and 3. * chi-square (2) = 5.11, p<.10. ** chi-square (2) = 16.95, p<.05

Table 3. OLS Regression Model Predicting Eating Habits Index (N=640)

Variable	B	SE
Male	-0.12	0.09
Age	0.01	0.00
Hispanic origin	-0.20**	0.11
Race		
American Indian or Alaska Native	-0.32*	0.15
Black or African-American	-0.37*	0.14
Other	0.11	0.10
Married	-0.02	0.08
Current smoker	0.03	0.12
Length of time with diabetes	0.01	0.01
Confidence can solve problems related to diabetes	0.21*	0.04
Social desirability (10-item index)	0.25*	0.08
Need help choosing the right foods	-0.23*	0.06
Mostly eat at home	0.23*	0.09
Nutrition built environment scale	0.05**	0.03
Time	0.07	0.05
Program participation measure	0.21*	0.03
Program type – ADSM	0.06	0.11

Note: OLS = ordinary least squares. ADSM = Advancing Diabetes Self-Management programs. Omitted categories are wave 2, female, not of Hispanic origin, white, not married, nonsmoker, mostly eat out, and Building Community Supports for Diabetes Care programs.

* p<.05; **p<.10.

Table 4. Logistic Regression Model Predicting People who were Sufficiently Physical Active[†] vs. Not (N = 385)

Variable	OR	95% CI
Male	1.63*	1.02, 2.60
Age	0.98	0.96, 1.00
Hispanic origin	0.73	0.42, 1.26
Race		
American Indian or Alaska Native	0.80	0.41, 1.56
Black or African-American	0.92	0.45, 1.91
Other	0.82	0.42, 1.62
Married	1.04	0.67, 1.62
Current smoker	0.36*	0.18, 0.71
BMI	0.95*	0.92, 0.98
Have health insurance	0.80	0.49, 1.32
Length of time with diabetes	0.98	0.96, 1.01
Confidence can solve problems related to diabetes	1.17	0.91, 1.50
Helped you find places where you can get physical activity or exercise	1.18*	1.04, 1.35
Days enrolled in program	1.00**	0.99, 1.00
Social desirability (10-item index)	1.39	0.92, 2.11
Time	1.11	0.75, 1.63
Intensity of intervention	0.63	0.27, 1.51

Note: Omitted categories are female, not of Hispanic origin, white, not married, nonsmoker, wave 2 and not being in a high intensity intervention site.

* p<.05; **p<.10.

[†] 30+ minutes of moderate physical activity 5 or more days per week, or vigorous physical activity for 20+ minutes 3 or more days per week.

5. Conclusions

- There is room for improvement in the eating habits of the diabetics in our study. Because there was some evidence of socially desirable responses, these may be overestimates of health eating habits.

- The following characteristics were related to better eating habits, controlling for other factors:
  - not being of Hispanic Origin
  - not being African American, American Indian, Alaska Native
  - having greater confidence in being able to solve problems related to diabetes
  - needing less help in choosing the right foods
  - eating most meals at home
  - self-reported access to healthy foods

- Participation in the Diabetes Initiative was also associated with better self-reported eating habits. Additional research is needed to examine the role that access to healthy foods plays in healthy eating.

- Reported rates of physical activity in our sample were higher than national levels. We found that 16 percent of participants were "physically inactive" and 26 percent were "sufficiently active," with the balance classified as "not sufficiently active," using standards promoted by the ADA and CDC.

- The following characteristics predicted the probability of meeting the sufficiently active physical activity guideline, controlling for other factors:
  - being male
  - not being a current smoker
  - having a lower body mass index (BMI)
  - having a health care provider who assisted in finding physical activity resources
  - participating in the program longer

- These results point to personal, behavioral, and community factors related to healthy eating and physical activity and suggest ways in which new health promotion messages could be targeted at audience segments that are less likely to engage in healthier lifestyles.

References

American Diabetes Association. Nutrition Recommendations and Interventions for Diabetes–2006: A position statement of the American Diabetes Association. *Diabetes Care*, 2006; 29: 2140-2157

American Diabetes Association. Position Statement: standards of medical care in diabetes. *Diabetes Care*. 2006; 28(suppl 1):S4–43. Available at: http://care.diabetesjournals.org/cgi/reprint/29/suppl–1/s4. (accessed December 9, 2006)

Fisher EB, et al. The diabetes initiative of the Robert Wood Johnson Foundation: demonstration projects emphasizing self-management. *Diabetes Education*. In press.

National Diabetes Fact Sheet. 2005. http://www.diabetes.org/uedocuments/NationalDiabetesFactSheetRev.pdf (accessed December 9, 2006)

Samuel-Hodge CD, Hill-Briggs F, Gary TL. "Lifestyle Intervention for Prevention and Treatment of Type 2 Diabetes." *Nursing Clinics of North America*, 2006;41(4):567-588.

Rate your plate. http://www.diabetes.org/nutrition-and-recipes/nutrition/rate-your-plate.jsp (accessed December 9, 2006).